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Palmer College Homecoming Presentation: Part I

by R. R. Gregory, D.C.

On August 23, 1966, at the Palmer College homecoming in Davenport, Iowa, Dr. R. R. Gregory lectured before an audience on the Grostic Analytical Procedure. The reader should be aware of the significance of the timing of the lecture. Dr. John Francis Grostic died in 1964, the National Upper Cervical Chiropractic Association, Inc. was formed on April 16, 1966, and the first NUCCA News was in December of 1996 (the first Monograph was in March 1973.) Selected portions of the lecture will be printed in two parts.

INTRODUCTION

It is my task today to present to you some idea of the Grostic Analytical Procedure. In so attempting to do, I have looked at the vast amount of background material that comprises this work and I have picked points from here and there for discussion purposes that I felt were of both benefit and interest.

One does not present a comprehensive synopsis of the Grostic work in an afternoon; one only talks about it; and realizes that to some it may be a contradiction of much that they have accepted as true.

This, however, is not intentional; and no defense is offered nor required. If an explanation is expected it is simply that we, as chiropractors, are living in a world today that must combine chiropractic science with general science; a world in which the principles of general science must be utilized in solving the problems of the vertebral subluxation, its production and its reduction. For this is the age in which we live and the voice of science is paramount and this is basic to the survival of chiropractic.

D. D. Palmer recognized this back in the early 1900s for he said: "Let us, as chiropractors, show the world that chiropractic is a science."

WHAT IS SCIENCE?

Science is accumulated and accepted knowledge which has been systemitized and formulated with reference to general truths or the operation of general laws. A law is a statement of an order or relation of phenomena which, so far as is known, is invariable under given conditions, and it must be demonstrated by measurement, supported by facts that no one can legitimately dispute and expressed in terms of a sound working principle which can safely be used as a guide.

If two times two equals four in mathematics, physics, engineering or in any other science, it must equal four in chiropractic; and it is when it does not equal four in chiropractic, and frequently it does not, chiropractic becomes aligned with cultism in the eyes of the public. The same is true of any other scientific principle that is relevant or applicable to the solutions of chiropractic problems.

The fact that two times two may not equal four is incidental. The point is that it is universally accepted that it does equal four and the same is true of any other principle, because it is only that which is universally accepted that constitutes truth. This, then, is the lever we have with which to effectively combat those who would destroy chiropractic: the simple fact that we, too, operate within the principles and procedures of universally accepted methodology.

This equating of chiropractic principles with those principles of the general sciences, and the use of the principles and procedures of methodology in establishing chiropractic principles and procedures as a science susceptible of universal acceptance can and does exclude much of present day chiropractic technic from universal acceptance, but in those areas where it does exist, it makes of the profession a true discipline and of the practitioner an individual who must submit to a disciplined practice. He can no longer be a law unto himself as to what he practices; he is bound, as is the practitioner of every other profession, to develop himself to the point where he can successfully understand and apply the principles of his profession, and those of general science, to his work.

This is the reasoning behind the Grostic work, and this is one reason why, after nearly a quarter of a century, it survives unchanged in its basic applications.

For the Grostic work is a difficult work, and it is a discipline. It demands of the chiropractor that he evolve—the he develop himself; and it provides the means whereby he knows the degree of his efficiency. It is based upon the basic restoration principle of chiropractic which requires the reduction of the subluxation misalignment factors—their restoration—the reduction of the nerve interference—its restoration, and the subsequent restoration of health to the patient. It is surgical in its exactness.

The day of belief in the chiropractic principle is long past; the day of proof of the efficiency of the principle is at hand; the day of its scientific application to disease processes is now. It is no longer enough for us to have faith; it is mandatory to have knowledge.

The task ahead is not to re-dedicate ourselves to the principle but to educate ourselves to obtain the fullest use of the principle. It is not the principle that is at fault; it is in the application of the principles that we have failed. It is in our failure to reduce the misalignment factors of the subluxation that we have almost destroyed the dream that was D. D. Palmer's.

Unless we, as a profession, can learn to successfully reduce the misalignment factors of the subluxation, we can never understand or know our real worth, achieve prestige, build statistics, have a universally acceptable science, develop an art or even survive.

One of the greatest attributes in my opinion that was possessed by Dr. John F. Grostic, and which is inherent in his work, was his ability and his desire to work within the basic restoration principle of chiropractic. His trust and his faith in that principle became greater with each passing year. Throughout all of his work he was guided by the basic restoration principle—all that he accomplished and all that he proposed to accomplish was encompassed within the scope of the basic restoration principle. It can be objectively said of him that he breathed new life into this principle, and that he gave his life for it.

And thus that which was faith and a belief in the beginning in a principle and a way of life became science and knowledge in the end. For belief is predicated upon the unknown and knowledge and science upon the known.

And this is the evolution of any chiropractor: that in the process of his life that which he has learned from others, and that which he has accepted upon faith alone from others, become that which, as he evolves through the years, becomes sure knowledge to him, based upon the facts, based upon the proof and the evidence, and based upon the experiences of his years.

This is the only originality that exists; the faculty that we recognize as greatness in an individual—the truly original mind—that accepts knowledge, works with knowledge and tests knowledge until, when it is re-issued by that same mind, it comes forth colored with the personality of the individual and as his truth because it is forged in the unyielding flame of his sincere effort.

Therefore, deep becomes his understanding and sure becomes his judgment for he, too, has met the test and he, too, has been disciplined through his own efforts and, thus, he, too, has triumphed in the triumph of the principle in which he believes and for which he lives.

For the only freedom that truly exists is that which comes from our triumph over ourselves and our environment, and the only way in which this is achieved is through self-discipline, and it is truly that which we learn after we think we know it all that really counts. It is through the resolution of our professional problems that we achieve freedom. The chiropractor who cannot solve the subluxation problems of his patients is enslaved by them.

So the greatest tribute that I could pay to D. John F. Grostic is that in his evolution as a chiropractor, he rose above his environment and his life became a testimony to that greatest of all kinds of success—ability, acquired through struggle and work, to achieve professional freedom, and mastery of the principles with which he worked.

The atlas vertebra is without question the most difficult vertebrae of the spine to analyze and to adjust, if by the word adjust we mean its restoration to or toward normal position. I am also well aware that the atlas has been sort of divorced from the spine by many chiropractors, and treated as sort of an unnecessary appendage, somewhat like the medics have viewed the vermiform appendix.

On the other hand, the atlas is a vertebrae of the spinal column; it subluxates, and frequently its misalignment is greater than that of any other vertebra; it can and does cause interference at the highest neurological level; the spine can cause interference to the nervous system, and it is susceptible of adjustment. Its position from a misalignment standpoint has much to do with the misaligned positions of subjacent vertebra, as we will demonstrate.

My Position

Now the first element of misalignment that must be ascertained in determining the upper cervical subluxation is the exact amount of atlas laterality. The exact position of the atlas vertebra as it moves either to the right or to the left in relation to the skull must be known and the amount of the movement must be ascertained. The film analyzer must accurately determine whether the atlas is right or is left of the skull and the precise amount of that movement in degrees or in fractions of degrees.

The reason for this becomes apparent when we realize that the correct position of the atlas in its misalignment will predetermine the correct position of the axis and its odontoid process and its spinous process. This is true of the subjacent vertebrae as well: third cervical, fourth cervical and so on.

It should also be apparent that a normal or central line cannot be established with any accuracy unless the exact position of the atlas vertebrae in its lateral misalignment is known. This central or center line would be that line which would be existent when all cervical structures or vertebrae were in their proper position and not misaligned. It would be a line which would be center to all vertebrae in the absence of all rotatory or linear movement of any vertebrae or any vertebral process. This line becomes the normal point of reference once it is established.

Therefore, by the process of precisely measuring the amount of atlas laterality and determining its amount in degrees, the film analyzer can subtract that amount and determine his point of reference for interpretative purposes.

Having established this point of reference, or center, malpositions of the axis and subjacent vertebrae become matters of relationship to the atlas laterality. Thus the exact position of the atlas is its lateral misalignment becomes the constant; atlas laterality becomes the norm from which measurements are made. Thus:

> (1) Laterality of atlas must be accurately measured because it is the constant from which all other measurements are derived inclusive of axis and its processes and subjacent vertebrae.
>
> (2) That once laterality of atlas is established, the rest of the measurement of vertebrae and vertebral processes becomes a matter of relationships, because everything relates back to atlas laterality.

Prior to the development of Cephalocentroscope, there existed no exact method of measuring the side-slip or laterality of atlas except as to its direction—either to the right or to the left. No one developed a method that would actually measure the degrees of movement of the atlas as to it moved to the right or the left.

To know whether or not the atlas had moved either to the right or the left was important, of course; but it was also vitally important to be able to mathematically determine exactly how far the atlas had moved in each case. It is necessary to know the degree, or the fraction of a degree, of atlas lateral movement in order to figure the amount of rotation of the atlas. In a case where there exists a small amount of rotation, the amount of lateral movement could change what might appear to be an anterior to what is actually a posterior. In addition to this, there is little value in taking post x-rays for unless you know the number of degrees of lateral movement of the atlas on the pre film, how can the amount of reduction of the misalignment factor of the subluxation be calculated?

By being able to determine accurately the degrees of atlas laterality, the chiropractor could then know the degrees of misalignment of the axis, third cervical and subjacent vertebrae so he would have knowledge as to how to align these structures

when he adjusted the atlas. He would also know at what point certain symptoms appeared in the patient and where certain nerves became impinged that produced certain symptoms in the patient.

Because of the fact that force is a vector, the adjustor who knows the degrees of the patient's subluxation can predetermine by measurement the proper stance to assume for any given subluxation. This is important because the adjustive force is a vector and it is going somewhere either to reduce the misalignment factors of the subluxation or to increase them, and create more nerve impingement and greater disease process. Measurement is a vital factor in proving the efficacy of the basic chiropractic principle and in making it acceptable to the scientific world. In the absence of measurement, this certainly could never be.

The mathematical principle upon which the c-c-scope is based is the geometrical principle that all points on the bisector of a line are equi-distant from the ends of that line. The instrument was constructed to be used in accordance with that principle. It is a series of lines of which the slot is the bisector of that line being used and of every one of the seven cross lines. Every point on the bisector of the lines-the slot-can be made to be equi-distant from every point on the lateral aspects of the skull being read. When all the points on the lateral aspects of the skull agree with every point on the bisector of the lines used, the mathematical and topographical center of the skull is established free of malformations.

The procedure for using the instrument is based upon a controlled pivot point system of extreme accuracy, which rules out malformations of bone structure within the readable area of the skull. In as much as it takes about three hours to adequately explain the procedure, time precludes our further examination of it today; and this brief explanation must suffice.

Then by the procedure of drawing a line across the transverse width of the atlas and through the exact points where the posterior ring junctures with the lateral masses, the atlas plane line is established.

The central ray of the x-ray is directed always along the plane of the atlas from the lateral view so that the points of juncture of the posterior ring with the lateral masses are not obstructed by the posterior ring.

At the point where the central skull line, drawn by the use of the c-c-scope and the atlas plane line meet, two angles will be formed by the joining of these two lines. The lessor of these two angles will be the side of laterality of the atlas. That is to say, that laterality will always be on the side of the acute angle, and the degree of laterality will be indicated by the number of degrees that are less than ninety degrees.

All movements of vertebrae are rotatory in nature. We speak of laterality of atlas but it is of a curved nature as it moves to the right or to the left around the condyles of the occiput. It is more in the nature of a curvilinear motion, but the point is that its' movement is predetermined by the slope of shape of the condyles, and these vary in people from a sharply angled condyles to flat condyles.

If the slope of these condyles is considered as an arc of a circle, the atlas in its lateral movement can be considered as moving around the perimeter of a circle, or the circumference of a circle, that fits the arc formed to coincide with the condyle slopes. To put it another way, if the slopes of both condyles were continued until a circle was formed, the size of that circle could be measured and determined to be a two-three-four-five inch circle or whatever it might be. This is called the condylar circle and they vary from a circumference of two inches to eight inches.

The superior articulatory surfaces of the axis can be treated in the same manner. Their slopes vary and will form the arc of a circle of a size consistent with the slopes. These vary in different cases from about three inches to fourteen inches.

Now what concerns us most relative to these circles, called the condylar and axial circle respectively, is the relative difference in their circumferences. The doctor needs to know this difference in order to so direct his vector of force so that he will go down and around the condylar circle and down and around the axial circle in all cases except those in which he is adjusting into a kinked cervical spine. In those cases he must adjust so that he directs the vector of force down and around the condylar circle and down and around the axial circle on the side opposite to the side of the laterality.

He must also assume his stance so that he will move the atlas around the condylar circle at the same ratio of movement as he will move the atlas around the axial circle.

For example, if the two articulatory surfaces that make up the condylar and axial circles were equal, that is to say, of the same size, the adjustor would not need to consider them except to stand in his adjustment so that his episternal notch was directly above the patient's atlas transverse process. His vector of force would in this case cause the atlas to move around the condyles of the occiput at the same ratio that the atlas moved around the superior articulatory surface of the axis. The atlas would be moving on the perimeter of these two circles at exactly the same ratio. This is, of course, assuming that all the other elements were also equal or zero, because there are three more elements to figure that combined with the condylar-axial circles add up to establishing the final line of drive. We will consider these as we go along.

The condylar circle is most frequently smaller than the axial circle, although there are exceptions, and the degree of variance between the two circles is relatively great; and there is considerable difference from case to case.

Therefore, these differences had to be figured out so that in any given combination of sizes of circles the position of the episternal notch to any given relationship of circles could be known immediately.

As an example, if the doctor found on his nasal film that the condylar circle circumference was a three inch circle and the axial circle circumference was a six inch circle, he consulted his manual and saw that he needed to raise his line of drive, or his vector of adjustive force, by one and one-half inches in order that he could go around both circles equally with the atlas, or, to put it another way, the mechanical advantage of being one and one-half inches higher with his vector of adjustive force caused the atlas to respond to the increased leverage by going around both circles at the same ratio of movement.

By now I am sure that you are aware that this question of where to stand to adjust any given subluxation is pretty much a question of using leverage to obtain the greatest mechanical advantage. The atlas is being used as a lever, and it is being used

in such a manner that it overcomes the resistance of the axis vertebra and its processes and the resistance of all subjacent vertebrae. Thus, this work is built upon a well known and often used mechanical principle, the principle of how to gain the greatest mechanical advantage in overcoming resistance and this principle is acceptable to the scientific world. Incidently, this is referred to as element number three, and is only one of the four elements necessary to obtain the standing position from the nasal film before going to the vertex film to ascertain the rotation of the atlas vertebra.

Now, again I am sorry that we have neither the time nor the means to acquaint you with the information as to how these circles are measured. This in itself would require nasal films for each of you and the instrument known as the Diarticulometer.

The Diarticulometer is a series of numbered semi-circles, and, as the name implies, it is for the purpose of measuring two articulations.

As the atlas moves laterally to one side or the other, the odontoid moves also in the majority of cases. Occasionally it does not move, but remains in a central position. Generally speaking, however, the odontoid will move laterally to the same degree as the atlas, to a lesser or greater degree than the atlas, or to the side of opposite the side of atlas laterality. That is to say, that should the atlas move right the odontoid may be left or vice versa.

The odontoid, therefore, always moves or misaligns in a certain relationship to the atlas laterality. This is another reason why the film analyzer must first find the direction of misalignment of atlas laterality and the exact degree of misalignment in that direction. He must do this first because there would be no other way to find the direction and the degree of direction of the odontoid laterality, or if odontoid laterality did, if in fact, exist. We will find that this same reasoning applies also to the spinous laterality, and to the positions of misalignment of subjacent cervical vertebrae. These structures in their movements tie back to the laterality of atlas, although the subjacent cervical vertebrae are modified in their misalignment factors by the influence of the pre and post zygapophysis.

As the odontoid misaligns in its relationship to the laterality of the atlas either more, equal to, or to the opposite side, we are again faced with the principle of leverage to obtain the proportionate mechanical advantage. This is the purpose of the four elements of the final line of drive as taken from the nasal film. This is why we add to the line of drive in order to raise it to obtain mechanical advantage, and why we subtract from it when mechanical advantage is not necessary or would be a detriment in applying the vector of force in the adjustment. Too much mechanical advantage would be the same thing as too high a line of drive, and it would create damage. Too little mechanical advantage would be the same thing as too low a line of drive and would increase the laterality of atlas, increase odontoid laterality, cause an opposite kink in the cervical spine and so on.

The final line of drive from the nasal film, when added to the rotation factor from the vertex film, constitutes the listing from which the adjustor delivers his final vector of force. What he is doing is to convert all rotatory misalignments that are discovered to exist in the patient's subluxation as shown on the x-ray films to one straight line vector of force which will be so exact that it will correct the rotatory misalignment factors of the subluxation. If he is 100% accurate in taking his films, 100% accurate in analyzing his films and 100% accurate in table placement and in the adjustment, his post x-ray should show a 100% reduction of all the misalignment factors of the atlas, axis and subjacent vertebrae; and inclusive of their vertebral processes.

In order to determine the relationship of the axis odontoid, spinous process and so on to the atlas laterality, an instrument was devised. It was named the Densmeter, which means literally "to measure the dens, or odontoid." Now, this instrument is aligned to the atlas in such a manner that the misaligned positions of the odontoid and the spinous of axis may be measured in relation to the laterality of atlas and in accordance with the size of the condyle structures or the condylar circle. That is why it has a revolving disc attached to it upon which are inscribed the proper degree markings consistent with the size of the condylar circle on the case being analyzed.

Because the condyles vary from case to case, different settings must be used for different size condyles. If the condyles, or condylar circle, are of a circumference of three inches, a number three setting would have to be used. In other words, the setting on the Densmeter would be equal to the size of the condylar circle, and the laterality of the odontoid process and spinous are calculated to that setting that corresponds with the size of the condyle slopes or the condylar circle.

These are the three instruments used in the Grostic work along with the number eight protractor, a plastic square, six-inch ruler and a compass. I have covered the three instruments briefly. The Densmeter takes at least a day-and-a-half in class. Briefly, then, in review: it is from the nasal film that the analysor obtains the degree of atlas laterality, the laterality of the odontoid and spinous processes of axis, their degree of movement, and the four elements which make up the line drive, or determine the standing position of the adjustor. The latter of course must include the rotation of atlas after it is measured on the vertex film.

The four elements consist of:

1. The atlas plane line, which is the line drawn across and through the attachments of the posterior ring with the lateral masses of the atlas; which is the transverse plane on which the atlas sets on the condyles; which is either high or low to a square line erected from the edge of the film with a plastic square, and from which is determined either the plus or minus factor.
2. Element number two is the relationship of the odontoid process laterality to the atlas laterality, either equal to the atlas laterality, more than, less than, or on the side opposite to the atlas laterality, and which, in these various situations, is represented by the appropriate number of inches or fractions of inches, in the final line of drive.
3. Element number three is the relationship of the size of the condylar circle to the axial circle.
4. Element number four is the leverage principle or kink. This is the amount of the atlas laterality in its relation to the angle formed by the erection of a line established from one-half the distance between the center of the base of the odontoid and the center of the axis spinous to the center of the seventh cervical vertebra.

All of these elements are found in the field manual or booklet with the necessary information as to how to apply them and when to apply them in any given case.

Stress and the Subluxated Spine — With Some *"Lite"* Thermodynamics

By: Christopher D. Chapman, D.C.

Thoughts, Trauma and Toxins are all primary causes of the spinal subluxation — or are they? So far, this writer has justified the trauma, but not the thoughts or toxins. Based on my studies, trauma is clearly primary to spinal misalignments, i.e., vertebral subluxation. However, thoughts (autosuggestions) and toxins appear to be secondary to trauma. I hope to be able to explain my reasoning in this article. Before doing so, I must clarify here that I am not saying that autosuggestion, which I will treat as stress in this article, is not related to spinal subluxations. Nor am I saying that toxins of internal or external origin are not related to the spine misaligning particularly inflammatory toxins which affect the connective tissue. What I am saying is that the initial architectural insult comes from a traumatic, injurious stressor which creates a "pathway" where upon a secondary stressor, like autosuggestion can then produce spinal misalignment. I have not been able to verify whether or not D. D. Palmer ever said that they were the actual *cause* of vertebral subluxation. They appear only to be mentioned in the context of disease in general.

Accidents and injuries can *tear loose* the connective tissue that holds the spine together. When the spine *breaks down* in the tear region it becomes *locked* into a *stressed* position and is said to be subluxated. The subluxated spine shows up in the individual as (1) a long and short (contractured) leg when lying down, (2) a high and low hip, and (3) a twisting of the body framework. A subluxated spine shows up as abnormal movements (often in persistent stumbling and shuffling and dropping things) and abnormal positions (locking of vertebral joints), both resulting in progressive asymmetric wear and tear as we *lean* to one side of another . . . as gravity slowly wins because we have lost our mechanical advantage as we mis-align into the frontal or sagittal planes.

The subluxated spine affects the BRAIN, the SPINAL CORD and the NERVES that make the body work. This means: Every movement we make . . . Every sensation we have . . . Virtually every body function. Nerves effect our ability to relate to the outside world — nerves transmit the outside world to our internal awareness. Based on observation, it is likely that our human nervous system goes beyond its presently defined anatomical and physiological boundaries. (Psychoneuroimmuniology — Dr. Candice Pert on *extra-synaptic* neuropeptides)

It is quite obvious that many people experience too much tension and stress — their lives are heavy and tired. Stress is a tough thing to scientifically assess. The problem with stress is that you can not culture it in a petri dish, you can not see it under a microscope and though there are some instruments-[questionnaires] designed to measure it, none of our objective "scientific" quantification methods can truly measure or predict it. Even still, people live under this amorphous dark cloud of energy we call stress. We cannot see it, but we can feel it. What is stress? Does stress "flow" [conduct] like an action potential or does it permeate us like a supersaturated solution? Maybe both or maybe neither. Stress may be so permeative (imbedded in our systems), that it cannot be separated out and measured distinctly. Should stress attributes be considered integral in all of our quantifications — anatometric and physiometric? If so, how would this change the way we view the mind and body of our patients? Let me try to develop this with you. Since stress exists or manifests within systems, and systems are comprised of constituents element, we may conclude that stress is a characteristic of the relationships of the constituent components within a given system. So, if we are to gain an understanding of stress, we must think systematically or holistically in recognition of the fact that our bodies are complex systems.

So far this writer has defined stress as an "amorphous dark cloud of negative energy". There are different types of stresses; There are tensile, torsional, compressive and oblique (shear) to name a few; there are electromagnetic, osmotic and hydrostatic stresses. Stress exists in environments capable of fluxuation and energy dissipation — i.e. "closed" redistributive systems or universes. Common characteristics of stress relationships are *magnitude, pressure and direction;* we could lump these qualities together as *energy transfers*. From a mechanical perspective we can often discretely measure energy transfers. We can quantify nerve conduction velocities (NCV's), we can measure the force of muscular contractions, we can apply Nernst formulation to calculate electro-chemical gradients across semipermeable cell membranes, etc. Mechanistically, we could write hundreds of thousands of words measuring and describing, in minute detail, the sensory and motor experience of stubbing one's big toe, but using this same Newtonian perspective, we can scarcely begin to quantify emotional stress. Perhaps the type of stress which effects people, that "amorphous dark cloud of negative energy" could be better understood if looked at through another model of system analysis, i.e., thermodynamics.

How does stress enter the sensorium? Do we feel stress like we feel a stubbed toe, a paper cut or a stomach virus? It is my experience that we do not. It is difficult to isolate the experience of stress to one particular area of our body. Although when we are experiencing it there does appear to be certain bioelectric-physiologic changes which are measurable. For instance, vagal tone is decreased and sympathetic tone increased. Stress has been associated with vascular hypertensive symptomatology. Certainly blood pressure increases in tense or stressful situations are commonly noted. EEG's show an increase in cortical electrical activity in association with cognitive appraisal of past, present of future events. The effects of stress seem to be a sensory-motor experience. This writer knows of no literature in which a description is offered describing which spinal tracts directly carry "stress afferent" and "stress efferent" signals? It's fascinating to me how we can experience something so cognitively "real" like

stress, but know so little scientifically about its material genesis within the human being.

How does stress effect a mind/body system like us human beings? Let's recall that stress is a natural attribute of a dissipative structure or system. "Stress" will *flow* or accumulate (for lack of better words) to a weak or energy releasing point in a system. [This is why a chain breaks at it's weakest link.] When that weak point "fatigues" the circuit of tension is broken and stress is dissipated to other areas of the closed system. (Remember, the sum of the energy within a system is constant, therefore, no energy can be created or destroyed, only redistributed to other areas which at some point in time have a greater potential or transient capacity for storing that energy.) So, when accidents and injuries initially "tear loose" (destablize) the connective tissue which holds the spine together a conduit for tension release is created, and the energy contained in that system can "minimize" thermodynamically. It's no secret to our profession that when our bodies' structural integrity is compromised, additional energy is required to prevent further instability and degeneration. This energy can not be "created" thus apportments from other integral energy systems must occur. Within structurally compromised architecture, organic or not, an avenue of energy equilibrium [entropy] is created. This is why a lumber jack's tree will fall before he chops completely through its trunk. We language this phenomenon of energy dissipation in laymen terms as well, we call it fatigue, leading to total collapse. Our bodies are bound by the same laws, indubitably more complex than we can imagine, but still governed by physical laws. Consequently, when we consider the aetiology of the vertebral subluxation we should look primarily to mechanical elements of traumatic injury. For it appears to me that unless a negatively supercharged autosuggestion is bludgeoning us repeatedly over long periods of time, it will not "tear loose the connective tissue" that in fact holds the spine together. Rarely, if ever, does the autosuggestion initiate subluxation as it is presently defined. If however a weakness has been created in the architecture, due to an accident or injury, then yes, that amorphous dark cloud of energy we call stress [autosuggestion] may result in thermodynamic minimization. In other words, when that weak point "fatigues" the circuit of tension is broken and stress is dissipated to other areas of the closed system. How, when and where do we intervene in the subluxation? This is a very significant question. One I will explore in another article, but for now, let's take a quick look at how we can manage stress. This writer believes stress, because of its nature, must be managed esoterically. (GK -esotericus = *within, into* or *in)*

Esoteric Stress Management

A very intelligent man showed me how to avoid fatigue, for it is much better to avoid it than recover from it. What causes fatigue in the human being? Pushing too long, too hard, too fast and too far . . . Taking on more responsibility than we can handle . . . Trying to hold on to something when it's time to let go. These three basic things are the fundamental causes of fatigue and can lead to a loss of emotional, spiritual and structural integrity — a "break-down" as we sometimes call it. Really though, it can be O.K. to push, it can be O.K. to take on responsibility and holding on is all right too — just know your limits!

Most of us know inside when we reach our limits. Though we have not "languaged" to our self the connection between *fatigue* and health. When we make this connection, we may rightfully utter a life saving "Ahh-Hah!" Only when we begin looking inwardly at our "inner state" will we begin to see the outside world as a reflection of the inner world.

There are a few basic principles about living which must be realized. 1) Life is a free gift, but it must be claimed by the beneficiary. Claiming your life is the beginning which allows you to truly live at a new level. How many of us have truly established ownership of our own lives? Very few indeed. Living from the nexus of true life "ownership", gives us the power to be free and whole regardless of our external circumstances. When you claim your own life you automatically relinquish your claim on someone else's. Let's stop just a second here . . . Am I saying that most of us have not claimed our own life? YES! I answer Yes, because it is evident that we are living ego driven lives wherein we expect external circumstances to change our internal states, and because we persist in our selfish demands on other peoples lives as if our "agenda" were more important than theirs. Ironically, our own "personal interest" is proof of our egocentrism. Our ego based life is a false life, a fluxuating matrix of images bundled together into a false self identity which we call "I". For example: *I'm* an intelligent man . . ., *I'm* an honest man . . ., People respect me because *I'm* . . ., *I'm* important because this or that . . ., my colleagues admire *me* because I have money, etc., *ad infinitum*. The second principle is: 2) The internal state creates the external experience. If the "internal man" is driven by the Ego, then the external visage of the man clearly manifests the pseudo "ego values", therefore his life is not his own, but is illusory. The real tragedy of this is: this is not who we truly are.

I grow more aware each day of the dangerous and destructive presence of *my* own ego. The most demanding work I do each day is to discipline my attention and become aware of my ego. The work is sublime. The work is the power of observing, and the power is *that the observing works.* This is a beautiful thing because the more junk I clear out of my inner world [ego], the less important my self-importance is to me and the more clear and predictable the outside world becomes. The inner creates the outer. Because of this, I'm devoted to truth or reality above any human relationship. For me, it is a fundamental drive towards happiness and peace. I'm convinced that our ego driven and self created identities are the root of our stress, enmity and personal unhappiness.

The "world" teaches us that the outer condition creates the inner state. For example, how normal it is for us to think in the following ways: "If only I had more money" . . ., "If only *they* would stop or start doing this or that, then I would be content . . ., "If only I had this, or could get rid of that, then I'd be happy and free." The "world" places top value on externally manufactured images and cultivates in every one of *their* institutions the development of ego. In essence, they sell you a

false identity, therefore- a false life. Is there any wonder the world is full of stress! The present state of the world is result of it ignoring true relationships. When we betray reality, stress is our immediate usury, it is just another example of cause and effect. When we disregard reality and do not conduct our lives according to reality, the result is spiritual, emotional and eventually physical decay. The law: The inner state creates the outer condition. Or in other words, the spiritual precedes the temporal or material. Thus, the age old Religious observations emerge: "Do we not need to be born anew? Must our heart change before we experience the joy of true rejuvenation and external change?"

From our *learned* view of "reality", this inward -> outward way likely seems mystical. However, it is not mystical, and only appears mystical because of its comparative strangeness to the "learned way" which we have been taught to look at ourselves and the world around us. We have never looked at the world around us from the *center* of our true identity. We have only been shown the world obliquely through our numerous imaginary identities. We have never really looked inwardly. In fact, it's impossible to look inwardly and see yourself. The seer is never seen. It is like the image of yourself in the mirror, *it does not see you, you see it.* You are real, the image is imaginary. If it can be seen it is not really you, but a false image. Whether we have been intentionally duped into looking at things incorrectly by someone or some thing is unimportant at this point. What *is* important, is that we transcend our present way of living, by changing our way of seeing. Now, without change, our imaginary images of *Self* allow us to be carried aimlessly through an imaginary world. Our false self images allow us to be pierced by many harmful schemes and designs. With our wakeful state, we begin to see clearly who we are not, not who we are. Thus we see the world around us as it truly is and not as it is not. When we internally experience this, all things externally appear to change and are made new. The fundamental reality is that the inner psychic state creates the external experience. The beautiful reality is that the outer things do not change first, WE DO! And we are the first to be benefitted from the change.

The "I" of our false identity is so programmed to be impacted and directed by external forces that the true identity of who we actually are is buried under the many layers of reactions and responses which have been *consciously and unconsciously learned and exercised over the years.* Our horrendous mistake: We take our learned reflexive reactions and responses to outer conditions to be that entity which we call *ourself/myself,* when in fact our *true* inner self merely observes and is operational on a purely rational-practical basis. This means that we are seldom, if ever, our true selves. It is our many false identities that interact socially and experientially. In the strictest sense, this is why *almost all* of our interactions are warped and damaged. Our relationships are formed on this shifting sand of false self images. Those relationships include, but are not limited to God, spouse and patients.

The good news is this: I, and all of us can begin to collapse and eliminate these self images merely by *seeing* them as our pseudo-identity or in other words, as a *non-I.* Being aware or seeing is very powerful because it is the basis of true human change. This is so because human beings have volition or free will and are actually capable of *true living* and self government. The changes and rewards are immediate because the premise of *this* changing process is — truth. (Remember: truth can be simply and accurately defined as — REALITY!) Stress comes in at all points from all directions when we are living a false life based on an untrue "image" of self.

Changing and the difficulties of the first step:

Beginning this type of genuine, long lasting change is difficult for at least two reasons. 1) The majority of people do not believe they have falsely identified themselves, and, would rather attribute their less than satisfactory experience of life to external forces, and 2) those who are open to the idea that they have falsely identified themselves do not know how to begin the process of change. For the latter, this seems like an impossible task because it is so difficult to break out of this truly vicious circle. But we in fact can intervene! How! by Query! (By questioning everything!) Our anger, our happiness, our depression, our thrills, our exuberance, our religion, our profession, our premises. By honestly querying, we begin to peel away the images and begin to see that many of our emotional states are directly tied to our false images about ourselves. This process of change does not entirely happen over-night. It is, however, immediately rewarding which in most instances, instantly develops a devotion to the *process.* When you become committed to this uncovering process with it's instantaneous spiritual rewards, time is irrelevant. The only thing which matters is reality and observation. From this point of view, *above down, inside out,* you need not get swept away by the world going on around you. From this point of origin, you can actually begin to live like free human beings were meant to live. This sounds like chiropractic philosophy to me.

Questions and comments welcome.

Elements of a Publishable Case Report

J. Palmer, Editor

Introduction

The mission of The Upper Cervical Monograph is to advance understanding of the Atlas Subluxation Complex and its far-reaching effects on the health of individuals. By focusing on the scientific research that shows most promise in enhancing the quality of health care delivered by the upper cervical practitioner, the Monograph will have the greatest probability of fulfilling its mission.

Historically for NUCCA, the major source of scientific research has been provided by the work of Dr. R. R. Gregory; much of this research has been empirical in nature, especially in the earliest days of development. The fact that all of Gregory's research was done exclusively in a clinical setting testifies to the potential of every practicing upper cervical doctor.

What is now realizable in NUCCA is an exponential growth in clinical based research. This is a direct consequence of board certification, a process which has broadened the expertise base while spreading the responsibility for success. The vehicle for the growth is the case report.

Purpose

The case report fosters a sharing of clinical findings — or is it really questions and observations — that may serve as the harbinger of future research, especially research in the clinical setting. Over time, the case report provides a historical documentation of the efficacy of procedure and a statement of the far-reaching effects on the health of individuals. Case reports are written by clinicians for clinicians and provide a concise means of sharing clinically useful information. Also, they may help to establish new standards of care.

Traditionally case studies provide new information; ideally for NUCCA practitioners it must provide information not explicitly published. Keep in mind that the vast majority of NUCCA seminar information never leaves the group in attendance. For example, few, if any, of the problem (unusual, difficult) cases presented at seminars have been published. Case reports within the organization become a documented teaching tool and outside the organization they become a revelation to the mainstream chiropractor. Also they contribute to a better understanding of an aspect of clinical practice and may become an important source of clinical continuing education.

Content

Case reports are usually 750-1000 words in length. They are descriptive rather than experimental investigations. The basic outline consists of:

1. Introduction
2. Description of the case
3. Comment or discussion
4. Summary of conclusion

When possible literature relating to the case should be cited. Many chiropractic college libraries will provide a literature search for a nominal fee.

The introduction should include a statement of purpose and should answer the question of why this case and not another. Write in the active voice and keep it simple. Define abbreviations when you first use them. Use subject for patient. Avoid information that could serve to identify your subject.

The description of the case should include biographical information — age, sex, race, and occupation, the subject's clinical history — chiropractic and medical when available, and all relevant exams and clinical tests used and their results including but not limited to radiographic, anatometer, contractured leg and thermographic. You should provide the program of adjustments: how frequently the subject was seen, how often the adjustments were given, and how long the patient was monitored. Also the subject's clinical course — which objective and subjective signs and symptoms were altered — and any potential complications should be stated.

The subjects listing should also be provided as well as a full description of what was done to reduce or eliminate the subluxation.

The discussion should include an unbiased presentation of the implications of the case. Literature, cases provided in seminars, and previous cases of the author which may either support or refute the findings of the case are discussed in this section. The author may present reasons for the results or make observations on the degree of the correction and its impact on signs and symptoms.

The summary or conclusion consists of a brief summary of the most important aspects of the case, including most important items learned and those results which may still be subject to other reasonable interpretation. It may also be appropriate to suggest further studies.

Summary

In review, keep it simple: clear, correct, concise, and complete. Remember the case report should focus on what has changed from care and what has not changed from care and provide a discussion of reasons why there were changes or why there were not changes.

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"Do You See Head Tilt?"

By Sherry Dickholtz, D.C.

The author provides us with an example of the existence of the ASC outside our species and the advantage of understanding the biomechanics and neurology. Editor

I was chatting with a horse owner about the majesty of her horse. While admiring him I said, "Did you know your horse has a head tilt?" She replied "No, but now that you mention it I can see one eye is lower than the other and it is even smaller in size." Objectively, the right eye was lower than the left by 1/4-1/2 inch. "Is that a significant symptom?" The owner questioned as she untied him from the crossties. Then she said "Watch how he moves, he's been doing this for quite awhile." The horse looked beautiful as he moved out, and then I saw it, his right rear leg exhibited characteristic stringhalt type gait (an involuntary flexion of the hock during forward motion) along with a delayed motion while the leg was coming down. The owner then asked "Can you do anything for this chiropractically?"

These are the questions I asked myself:

1. There's difficulty in walking, there's head tilt, and the cerebellum is not level, so could there be an occipital, atlas or combination of the two that could lead to this neurological deficit and abnormal muscle control to the rear limb area?

2. Could the uneven eye level be communicating to the cerebellum that the horizon is not horizontal, therefore, the paraspinal muscles are adapting to that incoming optic information?

3. Could a long-standing condition of inappropriate adaptation be too stressful thus leading to symptoms?

4. Could there be a brain stem (medulla) area misalignment be blocking or affecting the proprioception tracts?

So the question is: How and why can head tilt effect proprioception tracts, gait, optic and postural muscle control and coordination activity of an animal? It is through the brain stem neurology and associated tracts that allow the head and upper cervical area to control spinal and limb musculature. To understand these mechanisms let us review some basic neurology and anatomy.

Postural muscle control and balance comes from a few control centers. One of the major players is from the 8th cranial nerve, the vestibulocochlear nerve. This nerve gets initiated through the inner ear, which contains semicircular canals, which picks up information by means of flowing endolymph which bend small hair cells whenever the head tilts. The hair cells communicate with nerve fibers that lead to the vestibular nuclei (the spinal, the superior, the medial and the lateral nuclei) or to the cerebellum.

The 4 vestibular nuclei send their axons either to the cerebellum or to one of two tracts: the *medial longitudinal tract* or the *lateral vestibulospinal tract.* The *medial longitudinal tract* receives input from the superior, medial and the spinal nuclei. The *lateral vestibulospinal tract* receives information from the lateral nucleus. Let's review how these two significant tracts communicate to the limbs and spinal muscles with the information they are receiving from the inner ear and cerebellum:

Efferent Tract

The *medial longitudinal tract:* conveys messages to the nuclei of the eye muscles, to the cells innervating the muscles moving the head, the neck, the spinal accessory nuclei (cranial nerve XI), and the muscles of the trunk.

The *lateral vestibulospinal tract:* enters the cord in the anterior fasciculus and ends on the motor neurons of the muscles of the limbs. It is through the vestibule reflexes that act on the neck and on the limbs (vestibulospinal reflex) that are evoked principally by sensory input from the otolith organs.

Let's dissect these nerve tracts and muscle innervations a bit more and see how the tracts affect muscle function directly.

I. The *medial longitudinal tract* sends fibers to:

a. The nuclei of the eye muscles — Cranial nerves III (oculomotor), IV (trochlear), and VI (abducens)

b. Muscles that move the trunk

c. Muscles that move the head and neck — i.e. through the spinal accessory nuclei (cranial nerve XI)

The spinal accessory nuclei function: controls the trapezius, sternomastoideus and cleidomastoideus muscles

Trapezius — insertions; spine of the scapula

Origin: ligamentum nuchae

Action: elevates the front legs, moves the shoulder cranially and caudally

Problem: neck inflexibility, extension problem, shoulder spasms, scapula malposition

s.n.-Could a chronic misalignment, effecting the spinal accessory nuclei, effecting the trapezius function, finally lead to a wobbler type syndrome?

II. The *lateral vestibulospinal tract* sends fibers to muscles of the limbs.

Afferent Tracts

The proprioception and touch travel needed for foot placement comes from the *dorsal spinocerebellar tract.* At the upper spinal levels the dorsal columns can be divided into two bundles (fascicles) of axons: the *gracile* and the *cuneate* fascicle. The gracile fascicle ascends medially and contains fibers from the ipsilateral sacral, lumbar and lower thoracic segments. The cuneate fascicle ascends laterally and includes fibers from the upper thoracic and cervical segments. The two bundles terminate in the lower medulla in the nucleus gracile and cuneatus. Together they are called the dorsal column nuclei.

The pathways used to carry information from the upper limbs are from axons in the cuneate fascicle, which then synapse in the cuneate nuclei. The pathways for proprioception of the lower limbs use the gracile fascicle and synapse in the gracile nuclei. Various sources report that the medulla is about 1 inch in length and is located from the border of the foramen magnum to the inferior border of the first cervical vertebrae (the atlas). These tracts communicate to the cerebellum and to the medulla at a rate of 150 meters per second (1 1/2 football fields per second!). If these

tracts have interference, then by doing the righting reflex, by turning over the paw, the result will be a delayed righting reflex. One can see an incredible change with this reflex after the medulla has been cleared from any misalignment.

Reticular Formation Control Mechanism

In the reticular formation of the pons and the medulla there were two groups of nuclei identified that were involved in the control of posture. The nuclei in the pons facilitated spinal reflexes. The nuclei in the medulla inhibited spinal reflexes. These nuclei project through the medial and lateral reticulospinal tracts to ALL levels of the spinal cord. These are the tracks that are utilized when delivering an upper cervical adjustment; muscular and reflex changes throughout the body can be seen. The pontine reticular formation projects down the cord through the reticulospinal tract and terminate on and facilitate motor neurons that innervate axial muscles and extensors of the limbs. The medullary reticular formation gives rise to the lateral reticulspinal tract that projects bilaterally down the front of the lateral columns. This tract produces inhibition of neck and back motor neurons, similar to the medial vestibulospinal tract. This tract, importantly, makes polysynaptic inhibitory connections with extensor motor neurons and excitatory connections with flexor motor neurons. This tract can also excite motor neuron innervating extensor muscles and inhibit flexors! Obviously a tract to absolutely make sure is clear from a misalignment, otherwise any gait movement can be compromised.

Both medial and lateral reticulospinal fibers also modulate reflex action during ongoing movements and produce different effects, depending on the movement in progress at the time . . . These fibers coordinate posture and movement by integrating vestibular and other sensory inputs from the cerebral cortex. These centers and tracts are ultimately important to understand because postural adjustments are governed through the corticoreticulospinal system that was explained above.

Parasympathetic Blood Supply

The parasympathetic control on the arterial system allows for proper dilation while the body is at rest. Arteries abnormally contract resulting in abnormal blood pressure and slowed healing properties. Recall the pathway for the vertebral artery, ascending through the cervical transverse foramina through the atlas transverse foramina, then through the foramen magnum to the cerebellum and the Circle of Willis, which then supplies oxygenated blood to the rest of the brain. Keep in mind the possible effects the cerebellum and brain might be receiving from a misalignment resulting in tractionizing the vertebral artery!

So, did I answer the owner's second question: Can I change the stringhalt gait? At that moment I saw a typical pattern of both atlas and occiput misalignment causing the medulla to be compromised. In this case the atlas was misaligned superiorly (high) on the condyles on the right and the occiput was tilted inferiorly on the right (AVCA listing: ARS and OLS). I believe it was the right side of the occiput leaning into the medulla, effecting the lateral reticulospinal tract that was causing more of the neurologic deficit. The result was abnormally contracted muscles down the right side of the spine to the rear limb and proprioception tract interference at the medulla. I adjusted the occiput as OLS, while the owner braced the atlas on the right side. Then adjusted the atlas as ARS. The eyes leveled and opened with an equal opened appearance. Assessing the eyes can clue you in on this whole neurological circuit. I asked the owner to walk the horse. He automatically walked off about 70% improved! This neurology works when cleared from the boney misalignments. Some time has elapsed and the horse has stayed under chiropractic care. To date there have been no other characteristic signs of stringhalt or a delay in gait.

Conclusion: The body has many reflexes and compensation mechanisms to maintain balance. It is fruitful to think of the cerebellum as a center, which received enough information, both from the periphery and from the cerebral cortex, to set the mechanisms for appropriate postural and dynamic control. Allowing the cerebellum's structure to be level, a proper balance of posturing muscles and alignment with the skeletal structure can be attained. Ultimately — it is good to ask the question: Do You See Head Tilt?

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Article Review

by J. Palmer

The following is a review of "Comparisons of Lordotic Cervical Spine Curvatures to a Theoretical Ideal Model of the Static Sagittal Cervical Spine," an article by Donald D. Harrison, T. J. Janik, S. J. Troyanovich, and B. Holland (Spine, Vol. 21, No. 6, March 15, 1996.

The reviewer acknowledges both Spine and JMPT in the use of diagrams and captions plus data from their journals and commends D. D. Harrison, D.C. for his publishing productivity.[1,2]

This is a corrected reprint of the review which appeared in an earlier monograph. Figures and tables were inadvertently omitted in the original printing. Editor.

According to the authors, the earliest days of spinal modeling began in the 1950s in an effort to explain symptoms and spinal injuries in Air Force pilots. Harrison et al. use pain symptomatology in which spinal ligaments and discs have been implicated to argue that normal spinal position as determined by modeling be considered as a treatment outcome. If the spine was "normalized" then the deforming forces on the nociceptors, mechanoreceptors, and proprioceptors would be minimized.

The earliest reference to cervical curvature provided by Harrison et al. was by Suh (1975) who used a "three-point scheme to draw arbitrarily an arch of a circle for the cervical lordosis, thoracic kyphosis, and lumbar lordosis." The only other reference provided concerning the cervical region was by Pal and Sherk (Spine, 1988) who showed a lordotic configuration is mechanically required.

Spinal models are classified into two groups — geometric and mechanical. The mechanical group uses forces to explain shape; the geometric group describes the shape. Harrison et al. stated that "because existing models do not attempt a mechanical engineering solution of an ideal static normal position," they (the authors) present a static geometric model as the solution.

The authors geometric model is defined by: $\frac{H}{L} = \frac{SIN\,\theta}{\theta}$

H = cord length (height)

L = circular arc length

2θ = central angle subtended by arc length L; the radii forming the angle if extended would be tangent to the superior surface of C1 and to the inferior surface of T1 (see figures 1 & 2)

Basic assumptions of the model are:

(1) cervical lordosis is a circular arc;

(2) cervical lordosis extends from superior C1 to inferior body margin of T1;

(3) cervical disc height to vertical body height is in ratio of 2:5;

(4) C2 has a vertical body height equal to one other cervical plus one disc height;

(5) the "atlas plane line" is through the midlateral mass;

(6) lines drawn along the posterior vertebral body are tangent at midbody.

These assumptions allow a simple set of equations to define the model. The reader should note that the authors' "atlas plane line" is in the lateral x-ray view (not the nasium x-ray view) and is similar to, but not the same as, the NUCCA S-line.

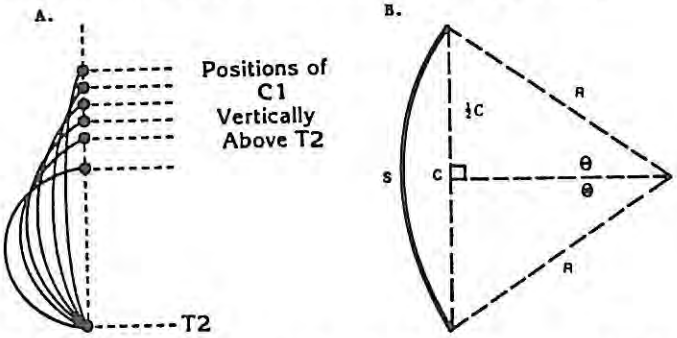

Figure 1. Height-to-length ratio for a family of circular arcs. In **A**, the length of a cervical spine is assumed to be constant, whereas the height is changed on the vertical axis, providing an isoperimetric problem for determining the normal lordosis. In **B**, S = arc length, R = radius, C = chord, and 2θ = the total arc angle. The authors have used some simple circular geometry and trigonometric ideas to solve for height-to-length ratio in terms of half of the arc angle in radians: height/length = H/L = chord/arc length = C/S = 2Rsin θ/R(2θ) = (sin θ)/θ.

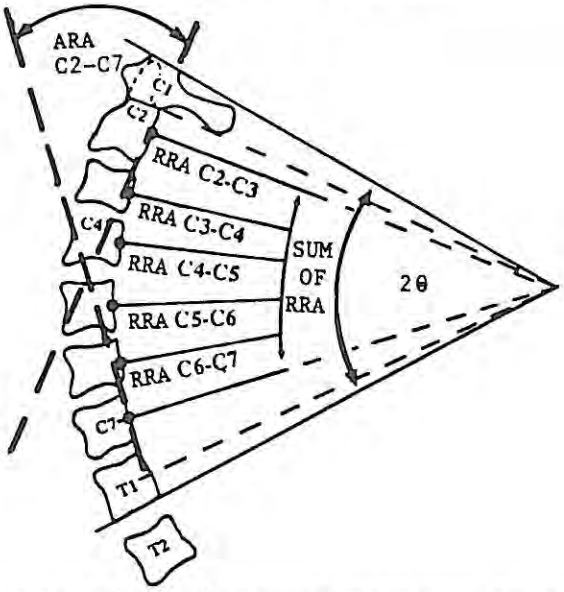

Figure 2. Cervical absolute and relative rotation angles. The absolute rotation angle (ARA) compares C2 with C7. The relative rotation angles (RRA) compare adjacent vertebrae at each disc space. A theorem dictates that the sum of the RRAs must equal the ARA. The total arc angle (2θ) is drawn from the top of C1 to the inferior of T1. The RRA at C2 compared with C3 is slightly larger because of the increased size of C2 as discussed in the assumptions in the text.

The database in the study consists of four hundred (400) randomly selected lateral cervical radiographs from a Massachusetts chiropractic clinic. For X-rays to be acceptable, C1-C7 had to be clearly visualized and the curvature had to be "lordotic." No mention was made of post x-rays, x-ray alignment, or magnification.

Patients while standing with right shoulder closest to the grid with eyes closed flexed and extended their heads before coming to a "comfortable neutral resting position." The authors state that this is a valid way to achieve positioning reliability.[1]

Seven angles and two distances were measured as follows:

(1) the angle between the "atlas plane line" and a horizontal (see fig. 3A) APA;

(2) the perpendicular, "S," from a vertical axis line (which originates at the posteroinferior corner of the body of C7) to the "posterior base of the dens of axis." (see figure 3B)

(It is assumed that "posterior base of the dens of axis" is equivalent to "a point on the posterosuperior body margin of C2" and is as shown.) This distance is used by the authors as a measure of the anterior weight bearing of the head.

(3) the "absolute rotation angle" (ARA) measured using R. Jackson's stress lines for C2 and C7; it is the acute angle so formed. A stress line is a line containing the posterosuperior and posteroinferior vertebral body margin points. (2 per vertebra) (see figure 4A);

(4) Five "relative rotation angles" (RRA) determined using Ruth Jackson's stress lines on pairs of adjacent vertebra, i.e., C2-C3, C3-C4, etc. These are "angles of extension"; (see figure 4B); and

(5) the distance used for the arc length was from the posteroinferior corner of C7 to the base of the dens as measured along the posterior longitudinal ligament.

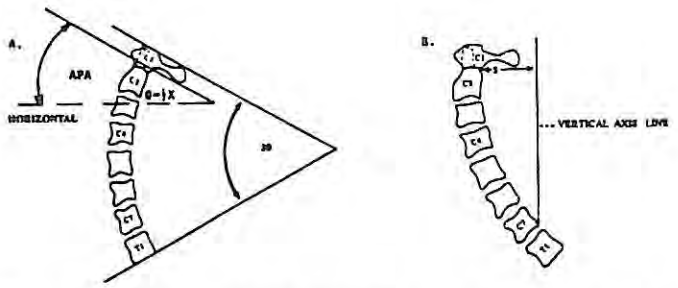

Figure 3. Atlas plane angle and anterior head translation. In **A,** the atlas plane angle, APA = θ – x/2, representing the plane of the atlas vertebra is measured between horizontal line and a line drawn at the inferior of the anterior ring and posterior ring of atlas. In **B,** the anterior translation distance, S, in millimeters is measured at the posterosuperior body margin of C2 along a perpendicular from a vertical line beginning at the posteroinferior body margin of C7.

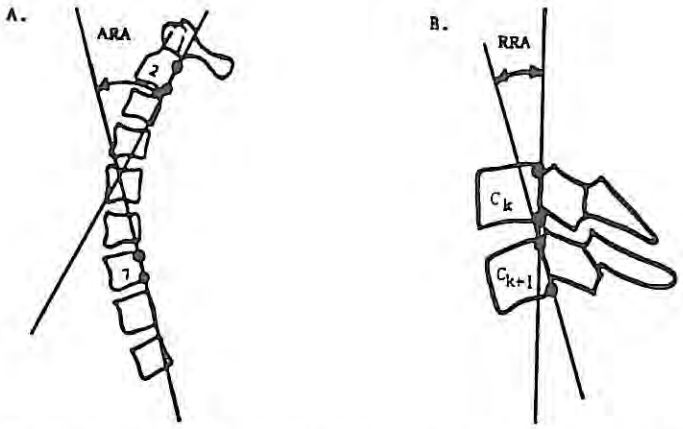

Figure 4. Absolute and relative rotation angle measurements. In **A,** the cervical lordosis was measured from C2 to C7 as an absolute rotation angle (ARA) formed from lines drawn on the posterior body margins. In **B,** the posterior body margins were used to construct an angle, RRA, of intersection of lines at each pair of cervical vertebrae, C^k–C^{k+1}. These five angles, C2-C3, C3-C4, C4-C5, C5-C6, and C6-C7 were termed RRAs, and C2-C3 is slightly larger than the other four angles because of the increased size of C2 over other cervical vertebrae.

Of the 400 subjects in the study, 237 were male and 163 were female. The average age was 35.4 years with the youngest being 5 years and the oldest being 79 years. If the age distribution of the 400 subjects fit a statistical standard normal distribution and using the study's average standard deviation of approximately 14 years, then one can reasonably conclude that approximately 16% (64) of the subjects were 21 years of age or younger and approximately 6% (24) of the subjects were 13 years of age or younger.

In this reviewer's opinion, it is unfortunate that the authors did not separate out these 24-64 subjects to see what effect they had on the results, including the efficacy of the model. Many readers might hypothesize that the greatest variation in lordosis would exist in subjects in their formative years, since the cervical curve is a secondary curve.

Results of the study include (1) an average "atlas plane line" inclination of 24°, (2) an anterior weight bearing of 15.5 mm (no source to film distance is provided; i.e., no magnification factor), (3) magnitude of the average lordotic angle (absolute rotation angle) of 34° with a range of 16.5°-66°, and (4) magnitude of relative rotation angle of 6.5 degrees. The authors' geometric model agreed with the radiographic measurements with an average difference of 5 percent.

It should be kept in mind that the authors excluded kypotic and "military" curvature. Although Harrison et al. cite studies that argue for a small percentage of the general population having kyphotic configurations, they argue the case for lordotic configuration in the cervical spine being a necessity for a normal state. They cite studies associating kyphosis with adverse tension

in the CNS and increased incidence of spinal stenosis, arguing for increased loading on the vertebral bodies and discs requiring increased extensor muscle effort in maintaining equilibrium, and suggesting greater degenerative changes in injury cases.

Of the differences in the female population compared to the male population in the group of 400 cases, this reviewer sees the female having a 2° larger average in the "atlas plane angle" than the males — a statistically significant difference as pointed out by the authors. Although the average absolute rotation angles were essentially the same for both genders, the females had a 1.5 degree greater relative rotation angle for C2-C3 (20% larger than males) but a 2.0 degree smaller relative rotation angle for C6-C7 (25% smaller than males). This reviewer would have appreciated a recognition and discussion of this observation. Is it explained by stating that a larger "atlas plane angle" requires less relative curvature in the lower cervicals?

Table I is a composite of a large portion of the data presented in the paper under review.

TABLE #1
Mean Values of the Magnitudes of Basic Parameters by General and Selective Criteria

	Group I n = 400			Group II n = 252	Group III n = 83	Group IV n = 69	Group V n = 150
Category	Males	Females	*Combined	Combined	Combined	Combined	Combined
Age	34.04	37.42	35.42	35.58	37.59	37.14	34.39
Atlas Angle (°)	23.23	25.22	24.04	23.86	28.43	28.06	21.72
Anterior Translation (mm)	15.35	15.53	15.42	14.86	13.94	14.20	16.83
Absolute RA (C2-C7)	34.32	33.51	33.99	34.09	43.70	41.64	28.70
Relative RA (C2-C3)	7.20	8.69	7.81	7.59	10.16	10.76	6.31
Relative RA (C3-C34)	6.01	7.43	6.59	6.43	8.33	8.12	5.80
Relative RA (C4-C5)	7.34	6.90	7.16	7.18	9.49	9.51	5.73
Relative RA (C5-C6)	6.46	5.11	5.91	6.26	8.06	6.23	5.19
Relative RA (C6-C7)	7.39	5.42	6.59	6.72	7.73	7.12	5.72

*In this column only, values were calculated by reviewer by weighting populations.

Group I - Cases by gender
Group II - Cases without "cervicocranial symptoms"
Group III - Cases in Delmas normal range
Group IV - Cases with a relative rotation angle greater than 20°
Group V - Cases with relative rotation angle between 1° and 11° magnitude

Group I contains all 400 cases used in the study; this group is characterized by lordotic cervical curvature without "flexed intersegmental positions." The combined column was calculated by this reviewer using weighted averages based on the authors' data.

Group II is a subset of the 400 cases who, according to Harrison et al., did not have "cervicocranial symptoms." This does not, according to the authors, rule out previous trauma. Group II has the potential of being a more appropriate population for defining a normal lordotic curvature than the universe of 400 cases. Based on the values of the averages in Group II and the combined averages in Group I, the populations appear to be essentially the same. This is somewhat to be expected because the cases of Group II comprise the majority of Group I cases. It is unfortunate that the authors did not provide a comparison column for the 148 cases who did have "cervicocranial symptoms."

Group III consists of 83 cases fitting the Delmas Normal Ideal Range (.94 to .96) in height-to-length ratio. (See Kapandji The Physiology of the Joints, 1974 Viii:20,29) The reader should notice in Table I that the "Atlas Rotation Angle" and the absolute rotation angle show very large differences when compared to Group I and Group II.

Group IV consists of 69 cases having a relative rotation angle of greater than 20 degrees — definitely a lateral kink! This reviewer would have appreciated a tally of frequency at level of cervicals involved.

Group V consists of 150 cases with all relative rotation angles being between magnitudes of 1 and 11 degrees. The authors chose this criteria because the literature reports "that the average sum of flexion-extension at any adjacent pair of cervical vertebrae is less than 21° (more flexion)...thus an RRA of 11° would be considered abnormal if such a large value occurred in a neutral lordosis." This group has a significantly smaller average absolute rotation angle and the smallest "atlas angle" of all groups.

This reviewer would have appreciated knowing the number of cases that satisfied both Group II and Group V criteria suggesting a different ideal normal.

This reviewer encourages doctors who read this review article to compile their own data base so that an "ideal normal lordotic cervical curve" could be more fully established.

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2. Harrison, D.D., Janik, T.J., Harrison, G.R., Troyanovich, S.J., et al. Chiropractic Biophysics Technique: A Linear Algebra Approach to Posture in Chiropractic. JMPT, Vol. 19, No. 8, October 1996.

Summary of Biomechanical Principles

By Glenn Cripe, D.C.

This article is a reprint of the Biomechanics lecture presented during the 1998 N.U.C.C.A. convention.

The purpose of the lecture was to give an overview of the biomechanical principles involved with each of the four basic types, including the out of pattern basic type two.

On many of the principles there is reference made to specific monograph articles. Other references are from lectures in the past, or from the video presentations by Dr. Gregory.

Please understand, to attain a thorough understanding of the biomechanics of each basic type, one should read the reference information in total. The points made in this article are in no way intended to be complete synopsis of the N.U.C.C.A. biomechanical rational.

It was my desire to simplify and give an easy to follow referenced summary in order to help the doctor understand and reason through various biomechanical cases.

BASIC TYPE I BIOMECHANICAL PRINCIPLES

A. BASIC TYPE 1

1. There are 2 basic type ones: Where the head is parallel to the vertical axis and where the head turns away from laterality and toward the vertical axis.
2. When increasing the height vector always increase the rotation vector by 7/8 of an inch.
3. When the head turns toward the vertical axis, supporting the head slightly higher than the Center of Gravity will aid in returning the head back toward the vertical axis. The Center of Gravity of the skull will rest over the lower edge of the headpiece support. The head should never move when adjusting.
4. The vector to correct the first basic type is usually consistent with the formula.
   Reference: Introduction to Biomechanics
5. The vector is always above the C/A.
6. Resistances that must be overcome are primarily angular rotation, the size of the superior articulating surfaces of C-2, and the degree of rotation of the cervical vertebrae below C-2. The effort's transverse process on the side of laterality. The fulcrum's occipital condyle on the side opposite laterality resistance.
7. The lower angle must reduce first.
   Reference: Introduction to Biomechanics
8. When the head is parallel to the vertical axis rotation could be either anterior or posterior. When the head moves away from laterality toward the vertical axis a higher incidence of posterior rotations will occur.
   Reference: Introduction to Biomechanics
9. Two factors that make up angular rotation.
   a. The degree of excursion of the cervical spine from the vertical axis.
   b. The degree of C-2 rotation in the transverse plane.
   Reference: Volume 4, No. 10, Monograph

BASIC TYPE 2 BIOMECHANICAL PRINCIPLES

B. 1. BASIC TYPE 2

1. When lowering the height vector and when the C-2 spinous is on the side of laterality torque should be increased.
   Reference: Volume 5, No. 2, Monograph
2. The smaller the size of C-1 laterality, the more that the height vector can be lowered in Basic Types 2 and 3.
   Reference: Volume 5, No. 2, Monograph
3. The larger the degree of C-1 laterality the less the height vector should be lowered.
   Reference: Volume 5, No. 2, Monograph
4. Determine the percentage of turning of the skull to the percentage of lateral movement of C-1. Subtract the degree of head turning of the skull from atlas laterality in order to determine these percentages. This is vital in determining the vector and headpiece placement.
   Reference: Introduction to Biomechanics
5. The correction vector is generally below the C/A vector and directs the effort into the occipital condyles of the skull. Reference: Introduction to Biomechanics
6. The effort is the atlas transverse process on the side of laterality. The resistance is the skulls' tipping: More specifically the occipital condyle on the side of atlas laterality. The fulcrum is the superior articulatory surface of C-2, opposite the side of laterality. C-1 is a second class lever.
7. The larger the C-1 rotation the further you can drop the height vector.
8. Torque is required when C-2 spinous is on the opposite side of laterality. Lowering the height vector will aid in C-2 spinous returning back toward the vertical axis.
9. Increasing the height vector as a substitution for torque in basic type two will increase the angular rotation.
   Reference: Monograph Volume 3, No. 8
10. Plane lines and angular rotations are not primary resistances because they normalize if the skull and C-2 are restored to the vertical axis.
11. The vector in a basic type 2 is almost always below the C/A in order to direct the force up into the condyle.
12. The C/A is considered the constant in determining the height vector. Reference: Introduction to Biomechanics

B 2. BASIC TYPE 2 OUT OF PATTERN CHARACTERISTICS

1. Plane line is high on the side of laterality. The skull is leaning from the true vertical, and both the skull and lower angle are leaning into the same frontal plane.
2. The resistance to the adjustment is on the superior articulatory surface of C-2 on the side opposite of laterality. Reference: Volume 4, No. 10, Monograph
3. Because there is a considerable amount of excursion

of the lower angle, a lower line of drive must be considered: It can not be dropped too low because the skull is not turned, (turned into the side of laterality).

4. The more the head leans away from the vertical axis the less you drop the height vector. You do not want to shift the head farther from the vertical axis.
5. The closer the head is parallel to the vertical axis the more you could drop the height vector.
6. The lower the mastoid support the faster the head will turn.
7. Note that the C/A is your "O" point, i.e., where 50% of the force will be going into the condyle on the side of laterality and 50% will be going down on the superior articulatory surface of C-2 on the side of laterality.
8. If the head is supported "high," (closer to center of gravity) to prevent the head from turning, you can lower the height vector to acquire enough force to go up and around the head to return the angular rotation back toward the vertical axis.
   Reference: Volume 5, No. 2, Monograph
9. The lower the head is supported, (towards the tip of mastoid) the less you would drop the height vector. Consideration must be given to positioning the mastoid support so as to prevent the skull from turning toward the vertical axis or turning further away from the vertical axis. Reference: Volume 5, No. 2, Monograph
10. A skillful adjustor may choose a low vector even when the higher percentage of C-1 laterality is caused by C-1 movement under the condyle (high PL) A rebound force off the occipital condyle moves C-1 to a horizontal position while turning the head toward vertical. A very complete tricep pull is necessary. If the tricep pull is not complete the PL could increase and the skull would most likely not return to vertical.
    Reference: Volume 5, No. 2, Monograph

C. BASIC TYPE 3

1. Effect: C-1 transverse process on the side of laterality.
   Resistance: The occiputal condyle on the opposite side of laterality. (and the skull)
   Fulcrum: Superior articulating surface of C-2 on the opposite side of laterality.
   Reference: Volume 3, No. 8, Monograph
2. Mastoid support is well below Center of Gravity so the head will be able to turn toward the vertical axis.
   Reference: Introduction to Biomechanics
3. The vector is well below the C/A as much as 2 inches from the formula.
   Reference: Volume 3, No. 8, Monograph
4. Dropping too low could influence the lower angle creating a Basic Type 1 pattern. Staying too high could create a Basic Type 2 pattern.
   Reference: Volume 3, No. 8, Monograph
5. The Skull moving into the frontal plane is producing the C-1 subluxation.
   Reference: Introduction to Biomechanics
6. The C/A is considered the constant in determining the height vector.

D. BASIC TYPE 4

1. Doctor must determine the relationship of the percentage of head tilt causing the subluxation and the percentage of laterality due to angular rotation.
   EXAMPLE:

AT	R4	(R1)	1-	25% due to headtilt
OD	R3		4-	75% due to angular rotation
SP	R3			

   Determining which element is most difficult to correct and which factor is causing the greatest insult to the nervous system, will dictate how much and which direction to change the adjusting vector. In this case, which angular rotation is greater. Staying higher will assist the doctor in reducing the angular rotation.
2. A head piece support that is too high might correct angular rotation but not head tilt. A support that is too inferior will correct head tilt but not angular rotation. Too high a line of force could increase the turning of the skull, increasing laterality and too low a line of force will increase angular rotation.
   Reference: Volume 4, No. 7, Monograph
3. The adjusting vector is only a starting point and is seldom consistent with the X-ray formula.
   Reference: Volume 4, No. 10, Monograph
4. The doctor must consider X-ray placement and analysis before biomechanical rational is made. Reference: Volume 4, No. 10, Monograph
5. The C/A is considered the constant in determining the height vector.

NUCCA Board Certification Revision
Approved: October 1998

(Presented by Marshall Dickholtz, Jr., D.C.)

The purpose of the certification program is to educate and qualify doctors in the NUCCA work and establish a set of standards for all NUCCA doctors to maintain. Doctors who successfully complete the program will be eligible to qualify as instructors in the NUCCA procedures. As doctors pass parts one, two, and three which concludes the process they will receive a certificate of accomplishment and be listed in the NUCCA directory as having completed and demonstrated proficiency through that specific level.

Only graduate doctors are eligible to participate in the certification program. There are three examination segments which must be passed in order to become certified. In the event of failure of the examination, or any part thereof, the candidate is re-examined on the part of the examination that is failed without paying an additional fee, provided re-examination takes place within a one year period. After that time a $50 fee is required to re-take an examination.

It is advised that a doctor participating in certification attend a minimum of one NUCCA seminar per year. A doctor who passes a specific part or becomes certified must attend a NUCCA seminar at least every 3 years to maintain certification in active status. After that time they will be listed certified inactive.

The examination is in three segments, as follows:

1. X-RAY AND INSTRUMENTATION

A. Understanding of X-ray alignment procedures

B. Theory about distortion, magnification, collimation

C. Produce five sets of consecutive pre-cervical X-rays suitable for analysis. When sending x-rays for review include a self addressed, stamped, return envelope

D. Submit a set of X-ray alignment films as designated by NUCCA X-ray outline

E. Examination on X-ray procedures

F. Examination on instrumentation

Parts A and B are a written examination composed of one hundred questions with a passing grade of 85.

The fee for segment 1 is one hundred dollars and must be included with the application.

2. FILM ANALYSIS, BIOMECHANICS AND ADJUSTING

A. Knowledge of osseous structures, biomechanics and adjusting. Written examination of one hundred questions. Passing grade of 85.

B. Submit five consecutive pre-sets of analyzed cervical spinal X-rays. The analysis must be the analysis outlined by NUCCA. The X-ray analysis must pass an inter-observer reliability of .90. When sending X-rays for review include a self addressed, stamped, return envelope.

C. Examination of film analysis.

The fee for Segment 2 is one hundred dollars and must be included with the application.

3. ADJUSTING

A. Submit 2 sets of 5 consecutive pre and post cervical X-rays. The post X-rays presented to the examining board should be those taken after the initial adjustment. Reduction in the misalignment factors must be 85% or better. Reduction in cases of gross or abnormal misalignment factors to be evaluated at the discretion of the examining board.

B. Submit an outlined work-up for each of the above set of X-rays. The work-up outline is to be requested from the examining board. When sending X-rays for review include a self addressed, stamped, return envelope.

The ten sets of X-rays submitted cannot be X-ray sets from Segments 1 and 2.

The fee for Segment 3 is one hundred fifty dollars and must be included with the application.

Each segment must be successfully completed before application can be made for the following Segment examination.

X-ray for parts one and two are submitted to:

Dr. Marshall Dickholtz, Jr.
9346 Waukegan Road
Morton Grove, IL 60053

X-rays for part three are submitted to:

Dr. Teresa Denton
217 West Second Street
Monroe, MI 48161

Laterality

by Marshall Dickholtz, Sr., D.C.

The Questions

What is the smallest measurement of atlas laterality and how much does it have to be reduced in millimeters to have a satisfactory reduction (half of a degree) when measuring a 3-inch condular circle?

The Calculations

Circumference of a circle, $C = \prod \times$ Diameter

$C = \prod \times 3$ inches x 25.4 mm/inch=239.52 mm

$$\frac{239.52 \text{ mm}}{360^\circ} \times 1^\circ = .67 \text{ mm per degree}$$

Now the literature and experience shows that 3/4 of a degree of laterality is the minimum for a subluxation.

$$\frac{.67 \text{ mm}}{1^\circ} \times .75^\circ = .50 \text{ mm}$$

One half of a degree of atlas laterality is a satisfactory measurement on post x-rays. If you move 3/4 of a degree to 1/2 of a degree you would only have to move the atlas .17 mm.

$$\frac{.67 \text{ mm}}{1^\circ} \times \frac{1}{4^\circ} = .17 \text{ mm}$$

Perspective

Of 1000 cases of Dr. Gregory, 32.9% were 3/4 to 1 degree of laterality; of 250 cases of mine, 36% were 3/4 to 1 degree laterality. One third of upper cervical practice is moving the atlas 1/4 to 1/2 of a degree or .17 mm to .34 mm.

Conclusion

Only .17 mm is all that is necesssary to move the atlas when there is 3/4 of a degree laterality on a pre nasal film. All other misalignments should also be considered. This is why it is essential for having the most accurate and sharpest x-ray films you can produce regardless of the initial time and expense to set up the equipment properly.